

Natural Environment Study Palo Verde Outfall Drain Bacterial Indicators TMDL

The purpose of the Natural Environment Study (NES) is to provide biological studies and biological-related information necessary for the environmental review process regarding land use decisions. Full disclosure of environmental impacts of proposed projects is required to satisfy legal mandates of various State and Federal statutes. Generally, the NES includes documentation of project area biological resources and an impact assessment of project alternatives on those resources.

PROJECT DESCRIPTION

The proposed project is an amendment to the Water Quality Control Plan for the Colorado River Basin Region (Basin Plan) that will establish the **Bacterial Indicators Total Maximum Daily Load (TMDL) for Palo Verde Outfall Drain**, and a corresponding Implementation Plan. A TMDL is the maximum amount of a pollutant that a water body can receive while it still meets water quality objectives (narrative or numerical) designed to protect beneficial uses of water bodies, pursuant to 40 CFR 130.2(d) and CWC 13241. Palo Verde Outfall Drain (which includes Palo Verde Lagoon) is owned and operated by Palo Verde Irrigation District (PVID), as part of a system that delivers water for agriculture irrigation.

E. coli, enterococci, and fecal coliform are bacteria-indicator organisms that apply to pathogens. (Pathogens can be bacteria or viruses.) Numeric water quality objectives for these three parameters were established by the Regional Board to protect water bodies in the Region that have a REC I or REC II beneficial use. Violation of these objectives indicates impairment of designated beneficial uses, and degraded water quality conditions. The Basin Plan states that designated beneficial uses of Palo Verde Lagoon and Outfall Drain include: water contact recreation (REC I); non-contact water recreation (REC II); warm freshwater habitat (WARM); wildlife habitat (WILD); and preservation of rare, threatened, or endangered species (RARE) (California Regional Water Quality Control Board 2003).

Bacterial Indicators in Palo Verde Outfall Drain are present at levels that violate the water quality objectives established by the Regional Board. The purpose of this project is to protect water quality in Palo Verde Outfall Drain from pathogen-caused impairments. Pathogens pose a health hazard for humans. Symptoms include gastroenteritis, dehydration, headache, vomiting, and fever. Specific human diseases caused by pathogens include typhoid, cholera, hepatitis, and polio.

The probable main source of excess pathogens to Palo Verde Outfall Drain is waterfowl (96.9%) (Tetra Tech March 2003). Other sources include mammals (2.3%), septic systems (0.4%), and songbirds (0.4%). Regional Board Staff are conducting analyses to determine the various contributions of sources. Future monitoring results may alter current results.

The Amendment will require responsible parties to utilize pathogen-control Management

Practices (MPs). The proposed time schedule outlined in the TMDL Implementation Plan occurs in two phases, and requires full compliance within ten years. The proposed Basin Plan Amendment:

1. Updates references to the State's Nonpoint Source Pollution Control Program.
2. Includes Regional Nonpoint Source Control Program elements.
3. Deletes dated information that is no longer accurate.
4. Establishes a numeric target consistent with existing Basin Plan water quality objectives for pathogen-indicator organisms (Table 1).
5. Adds a section for this proposed TMDL that:
 - a. Summarizes Palo Verde Outfall Drain Bacterial Indicators TMDL elements, including the Problem Statement, Numeric Target, Source Analysis, Margin of Safety, Seasonal Variations and Critical Conditions, Loading Capacity, and Load Allocations and Wasteload Allocations;
 - b. Designates responsible parties and management actions;
 - c. Lists recommended Management Practices (MPs) to control pathogens, with estimated implementation costs;
 - d. Describes recommended actions for cooperating agencies;
 - e. Describes TMDL compliance monitoring and enforcement activities;
 - f. Describes Regional Board water quality monitoring and implementation tracking activities to assess TMDL implementation;
 - g. Describes public reporting activities; and
 - h. Describes the Regional Board review process.

Table 1: Water Quality Objectives

Indicator Parameter	30-Day Geometric Mean	30-Day Log Mean^a	Maximum
E. coli	126 MPN ^b /100 ml	--	400 MPN/100 ml
Enterococci	33 MPN/100 ml	--	100 MPN/100 ml
Fecal Coliform	--	200 MPN/100ml	c

- a. Based on a minimum of no less than 5 samples equally spaced over a 30-day period.
- b. Most probable number.
- c. No more than 10% of total samples during any 30-day period shall exceed 400 MPN/100 ml.

STUDY METHODOLOGY

Literature Review Methods

Research was done on the wildlife, vegetation, and habitats in and near Palo Verde Outfall Drain. Literature sources included field guides, research papers, websites, government publications, and a query of the California Natural Diversity Database (California Department of Fish and Game 2003), among others. Information specifically cited within this report is recorded in the "References Cited" section at the end of this Natural Environment Study. Background information not specifically cited within the text is recorded in the "References Relied Upon" section at the end of this Natural Environment Study.

Special status species recorded as "accidental" in the literature are not included in this report, as project area habitat generally is not considered suitable for these species. Accidental visitors likely were blown off-course by extreme inclement weather conditions, and would not otherwise utilize project area habitat.

Special Status Definitions

The California Department of Fish and Game, and U.S. Fish and Wildlife Service, designate the status of a species. "Special" is defined here as plants, animals, or natural communities whose populations are of concern, including those that are endangered, threatened, special concern species, and otherwise rare/sensitive. This is consistent with the California Natural Diversity Database, which tracks such animal species (California Department of Fish and Game, July 2003), plant species (California Department of Fish and Game, October 2003) and natural communities (California Department of Fish and Game, September 2003). Special status species are categorized and defined as follows:

"Endangered" species are those that have such limited numbers that they are in imminent danger of extinction throughout all or a significant portion of their range.

"Threatened" species are those that are likely to become endangered in the foreseeable future.

"Special Concern Species" are those that have declining population levels, limited ranges, and/or continuing threats that have made them vulnerable to extinction. (State-listed Special Concern Species that are "Fully Protected" are those that may not be taken or possessed without a state permit. Federally-listed Special Concern Species are no longer tracked by the U.S. Fish and Wildlife Service, and thus are not discussed in this report.)

"Rare/Sensitive" species are those that are biologically rare, very restricted in distribution, declining throughout their range, in danger of local extirpation, are closely associated with a rapidly declining habitat, or have a critical, vulnerable stage in their life cycle that warrants monitoring.

Endangered and threatened species have the highest level of protection, then special concern species, then rare/sensitive species. When a species is listed in more than one category in the

California Natural Diversity Database (e.g., SSCS and R/S), this Natural Environment Study records only the category offering the highest level of protection.

ENVIRONMENTAL SETTING

Affected Environment

The project area is located in southeastern California, in Riverside and Imperial Counties, and about 6 miles west of the Lower Colorado River. The area affected by the proposed project includes all of the irrigated area within Palo Verde Valley (87% of Valley land). Specifically, the affected area consists of: (a) Palo Verde Irrigation District system, including Palo Verde Lagoon, Palo Verde Outfall Drain, and smaller drains, and (b) surrounding farmland and developed land that feed into the drain system. This equates to about 91,000 acres (83,000 acres in Riverside County, and 8,000 acres in Imperial County). Figure 1 shows a map of Palo Verde Valley in a regional context. Figure 2 shows a map of Palo Verde Outfall Drain project area.

Figure 1: Palo Verde Valley – Regional Setting

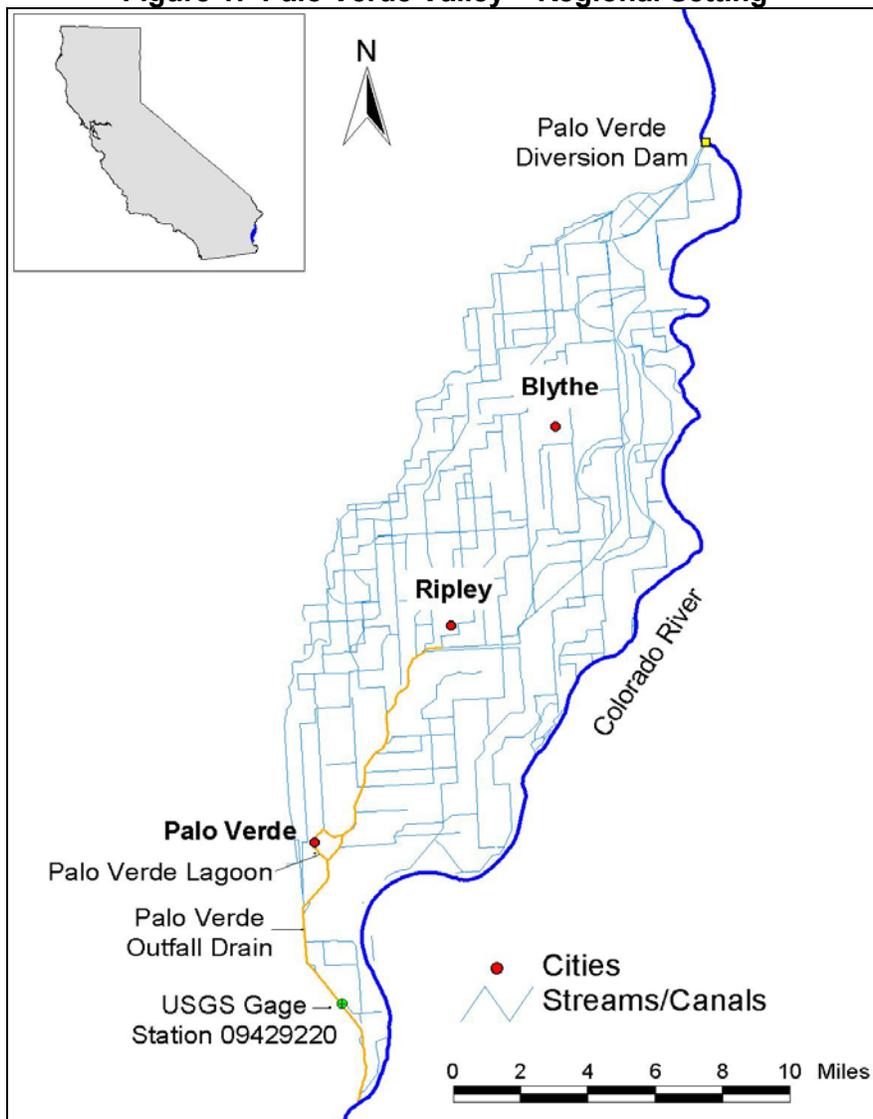
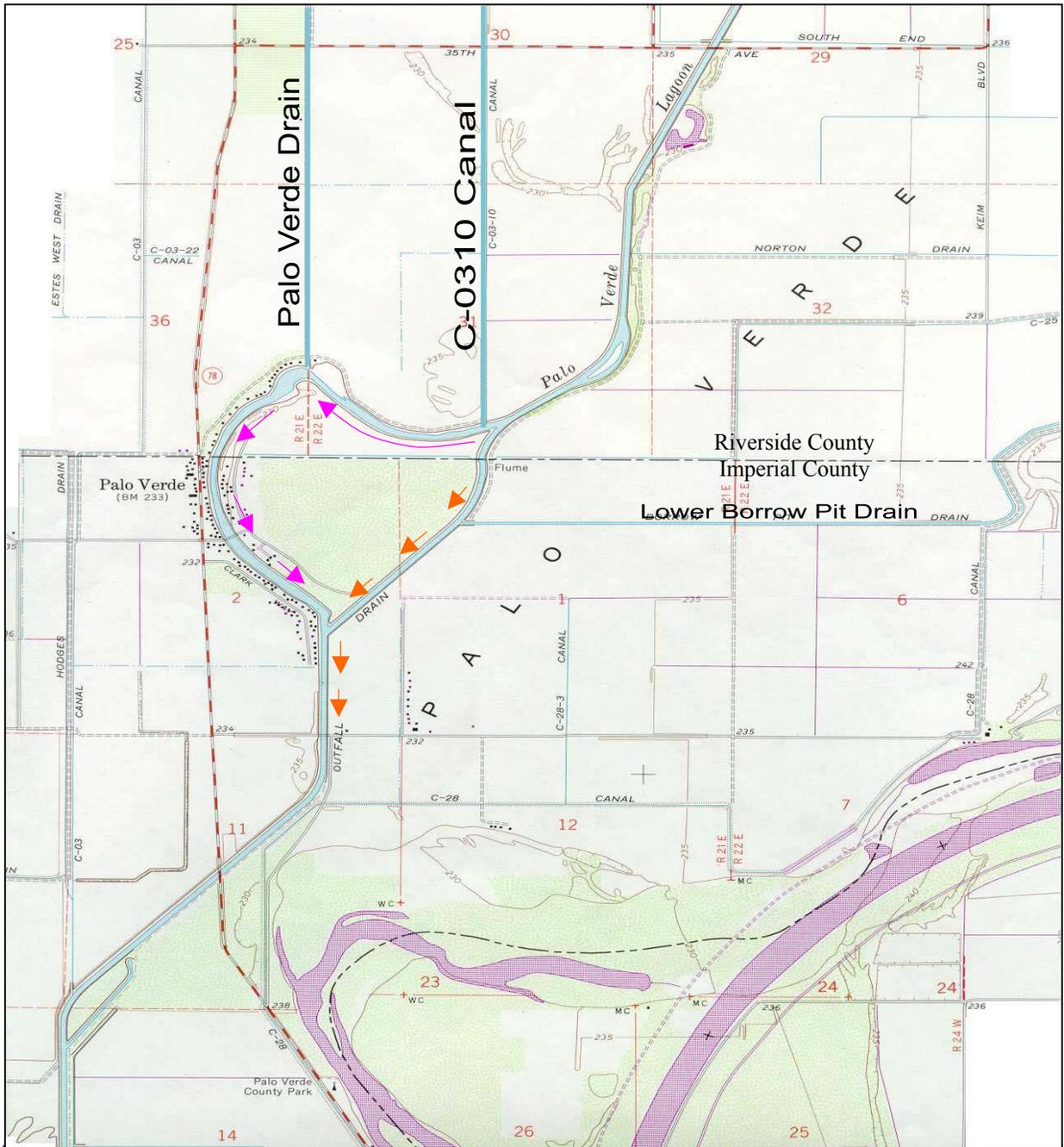


Figure 2. Palo Verde Outfall Drain -- Project Area



<p>Location Map Palo Verde Lagoon Section 36, R21E, T8S; Section 31, R22E, T8S; and Sections 1 and 2, R21E, T9S, SBB&M Palo Verde USGS Quadrangle Scale 1" = 2000'</p>	<p><u>Notes:</u></p> <ul style="list-style-type: none"> → Direction of Flow in PV Lagoon → Direction of Flow in Palo Verde Outfall Drain
--	---

Weather

The project area is in the Colorado Desert region of the Sonoran Desert. The climate is hot, with dry summers, occasional thunderstorms, and gusty high winds with sandstorms. The area is one of the most arid in the United States. The average rainfall is about 2 inches per year, and summer temperatures reach 120°F (U.S. Fish and Wildlife Service 2003).

Land Uses

Land uses in Palo Verde Valley were identified based on the Multi-Resolution Land Characterization (MRLC) land use database (U.S. Geological Survey 2002).

The dominant land use (85%) in Palo Verde Valley is agriculture. Major crops are alfalfa, cotton, and wheat and barley (Palo Verde Irrigation District 2002). Local agriculture is sustained by irrigation water provided by PVID. Water is diverted from the Colorado River at Palo Verde Diversion Dam and into 150-mile system of canals and drains. This water empties into Palo Verde Outfall Drain, and eventually back into the Colorado River near the Cibola National Wildlife Refuge.

Urban use (1.9%) is centered around the unincorporated community of Palo Verde. The community is located on a wide spot around the Lagoon area, which is a small canal-like lake formed from an old oxbow channel bed. This community overlaps the border of Imperial and Riverside Counties, and is located about 6 miles west of the Colorado River. Its population is roughly 1,000. However, this fluctuates seasonally with a large decrease in summer. The community consists mostly of residential housing, but also includes two RV parks. Wastewater is treated by septic tanks, and disposed of via leachfield systems. The Lagoon is used for water contact recreation such as swimming and water-skiing, and non-contact water recreation such as picnicking and boating.

Shrubland (7.4%), bare land (1.5%), orchard/vineyard (1.4%), open water (1.2%), and a mixture of forest, urban recreational grassland, and wetland are other land uses. There are no large livestock operations in the area, though about 19,000 sheep are imported during the winter months (November through May) to graze alfalfa fields not slated for market. In the spring when the animals leave the Valley, their population has grown by about 1.5 times the original population due to lambing. Table 3 summarizes land uses in Palo Verde Valley.

Table 3. Land Uses in Palo Verde Valley

Land Use	Area (acres)	Area (square miles)	Percent of Total
Agriculture (Pasture/ Row Crop)	97850	153	85.5
Shrubland	8466	13	7.4
Urban (Residential/ Commercial)	2202	3	1.9
Bare Land (Rock/ Sand/ Clay)	1682	3	1.5
Orchard/ Vineyard	1583	2	1.4
Open Water	1343	2	1.2
Forest	1122	2	1.0
Urban Recreational Grassland	89	0	0.1
Wetland	87	0	0.1
TOTAL	114425	179	100

Application of manure fertilizers (a bacteria source) is a common practice on Palo Verde Valley agricultural croplands. Rainfall and irrigation have the potential to wash off of land and into water bodies. When applied in Palo Verde Valley, manure typically is disced into the soil one to two months prior to planting for non-direct consumption crops (e.g., alfalfa, cotton).

Historical Setting

The Colorado River once flowed unimpeded for 1,700 miles from the southern Rocky Mountains through the eastern Great Basin and into the Gulf of California. Marshes, riparian forests, and backwaters were present along the entire Lower Colorado River. Seasonal water flows and corresponding sediment loads dominated the ecosystem. Channels commonly shifted, destroying habitats and creating new ones. Wildlife adapted to use of the main channel with separate or connected oxbows and backwaters.

The Colorado River Gold Rush of 1861 spurred steamboat trade along the Lower Colorado River, leading to cutting of large amounts of cottonwoods, willows, and mesquites. Most of the large cottonwood-willow stands and mesquite bosques had been cut down by 1890. In the next few years, exotic fish were introduced and human-caused stream alterations made (U.S. Bureau of Reclamation 1996).

By 1927, about 95,000 acres of farmland were irrigated along the mainstem of the Lower Colorado River between Cottonwood Basin and the International Boundary, most of which was in the Imperial Valley, leading to a reduction in riparian habitat. Boulder Dam (now Hoover Dam) was completed in 1935, drastically and suddenly changing water flow of the river, and eliminating the tremendous floods that were the base of the ecosystem (U.S. Bureau of Reclamation 1996).

These and other developments caused a dramatic alteration of historic habitat into the habitat that is present today. Present habitat is described in sections below.

Ecological Setting

Palo Verde Outfall Drain and surrounding drainage system provide important habitat for many kinds of wildlife. Birds are the most diverse wildlife group using the drains, as indicated by their abundance and species richness. Fish provide sustenance and recreational benefits to users (although this is unauthorized in the Riverside County portion of flow), as well as food for numerous bird species.

Intricate food webs incorporate many terrestrial and aquatic elements, including plants, invertebrates, fish, mammals, reptiles, amphibians, and birds. Organisms at the food web base are consumed by organisms at the next highest trophic level. These organisms then are consumed by the next highest trophic level, and so on until the top of the food web is reached.

The base of the food web includes plankton, detritus, and aquatic vegetation. These organisms are consumed by aquatic invertebrates such as snails, waterboatmen, and insect larvae. Aquatic invertebrates are consumed by crayfish, Asiatic river clams, and fish. (Some fish also may consume plankton directly.) Endangered fish present in or near the Outfall Drain include the desert pupfish and razorback sucker (California Department of Fish and Game 2002, U.S. Fish and Wildlife Service 2003). Various sport fish are common.

Turtles and birds are at the top of the local food web. Turtles, such as the spiny softshell turtle, prey on desert pupfish and aquatic invertebrates including Asiatic river clams. Many bird species feed on crayfish, clams, other aquatic invertebrates, fish, and aquatic vegetation. These birds include the ruddy duck, American coot, northern shoveler, cattle egret, and Yuma clapper rail, among others.

Riparian habitat provides important habitat for songbirds. Red-winged blackbirds, yellow-rumped warblers, and song sparrows are common. Riparian corridors are potential wildlife movement corridors and constitute sensitive habitat. The dominant plant species along these corridors is tamarisk (also known as salt cedar), an introduced species that has displaced native riparian species along the Lower Colorado River.

Wildlife use the Outfall Drain as alternative habitat because 97% of California wetlands have been converted to other uses or otherwise degraded (Bennett 1998). The Outfall Drain and its Lagoon area are near the Cibola National Wildlife Refuge and Salton Sea, which are critical stops for millions of migrating birds on the ecologically important Pacific Flyway, a major migratory route connecting Canada and the U.S. to Mexico and Central America.

Palo Verde Outfall Drain empties into the Colorado River near the Cibola National Wildlife Refuge. The federally-administered refuge was created in 1964 to mitigate for fish and wildlife habitat loss due to the U.S. Bureau of Reclamation's water salvage and channelization projects along the Colorado River. The Cibola National Wildlife Refuge is located about 10 miles south of Palo Verde Outfall Drain. The refuge contains state and federally endangered and threatened species.

Habitats

Available habitat is intricately associated with wildlife diversity and abundance. Environmental impacts to habitat have direct impacts on the wildlife dependent upon that particular habitat.

Habitat disturbance due to major developments along the Colorado River have resulted in the limited distribution of native vegetation along the entire river length.

Project area habitats are described below. These habitats include freshwater marsh, open water, agricultural land, tamarisk scrub, and riparian.

Freshwater marsh is common in the project area. This habitat occurs all the way across in the narrow tributary drains, and along the edges of the Outfall Drain. These marshes are dominated by non-native species such as common reed (*Phragmites australis*) and cattail (*Typha* spp.). Freshwater marsh is a special status natural community (called “wetland” in this report).

Open water is common in the project area. This habitat occurs in the Outfall Drain (including the Lagoon area) and in some tributary drains. This habitat is the portion that is always flooded, and may support submerged or emergent vegetation.

Agricultural land is common in the project area. Though not considered natural habitat, many species utilize agricultural land for food, cover (e.g., scattered buildings and vegetation), and/or access to other habitats. This habitat occurs on the margins of the water body—in many cases, agricultural land extends directly to the water’s edge.

Tamarisk scrub is located sporadically in the project area. This habitat occurs mainly along parts of the Outfall Drain, along bank edges. This habitat consists mainly of introduced *Tamarix* species, which replaces native vegetation, especially in riparian areas, and reduces water available for wildlife.

Riparian communities are located sporadically in the project area. This habitat occurs mainly along parts of the Outfall Drain, along bank edges. This habitat is characterized by dense thickets of trees and shrubs (e.g., willow) along water bodies. Sonoran Cottonwood Willow Riparian Forest is a special status natural community, and is one type of riparian community.

The project area is near to land that contains other habitats utilized by wildlife. These other habitats include cave/mine/cliff crevices, fine sand, and non-riparian brushy areas (various non-Tamarisk desert scrub communities). Though not considered natural habitat, houses and residential areas also are used by wildlife, as buildings and planted vegetation provide food and cover.

Representative Plants

Table 4 lists plant species that occur in the project area. This list is not complete, but rather, is representative of plants in the area.

Table 4. Representative List of Plant Species in the Vicinity of the Project Area

Common Name	Scientific Name
Arrowleaf balsamroot	<i>Balsamorhize sagittata</i>
California brittlebush	<i>Encelia californica</i>
Arrow-weed	<i>Pluchea sericea</i>
Beavertail cactus	<i>Opuntia basilaris</i>
Bladderpod	<i>Lesquerella palmeri</i>
Desert agave	<i>Agave deserti</i>
Catclaw acacia	<i>Acacia greggii</i>
Honey mesquite	<i>Prosopis glandulosa</i>
Ironwood	<i>Olneya tesota</i>
Ocotillo	<i>Fouquieria splendens</i>
Foxtail cactus	<i>Coryphantha vivipara alversonii</i>
Wiggins' cholla	<i>Opuntia wigginsii</i>
Cottonwood	<i>Populus fremontii</i>
Willow	<i>Salix</i> spp.
Russian thistle	<i>Salsola tragus</i>
Tamarisk	<i>Tamarix</i> spp.
Common reed	<i>Phragmites australis</i>
Cattail	<i>Typha</i> spp.

IMPACT TO BIOLOGICAL RESOURCES

Impact Assessment

The project area contains important biological resources, including special status wildlife, plants, and natural communities. Over one-hundred special status species and natural communities were identified in the literature review as occurring or potentially occurring in the vicinity (i.e., in or near) of Palo Verde Outfall Drain (Table 5). These included twenty endangered and/or threatened species, and critical habitat for the razorback sucker. Table 5 presents information regarding special status species and natural communities, including status, habitat (nesting, roosting, and/or foraging), local presence (regardless of abundance), and potential for being impacted by the project. The impact assessment is based on species' sensitivity to project impacts, species' natural history requirements, site proximity to known occurrences, species' range, seasonal abundance, consultation with local resource managers, and professional experience.

Some identified species do not occur in the project area due to a lack of suitable habitat (e.g., fine sand) on-site, and thus will not be impacted by the project. Other species have a low potential for occurring on-site, and thus a low potential for being impacted by the project.

Table 5. Special Species and Natural Communities—Impact Assessment

Common Name	Scientific Name	Status	Habitat	Local Presence	Potential for Being Impacted
Wildlife = 101					
MacNeill sooty wing skipper	<i>Hesperopsis graciellae</i>	R/S	Scrub	Y	None
Colorado River toad	<i>Bufo alvarius</i>	SSCS	Scrub	Y	None
Couch's spadefoot	<i>Scaphiopus couchii</i>	SSCS	Scrub	Y	None
Lowland leopard frog	<i>Rana yavapaiensis</i>	SSCS	Open Water	Y	None
Flat-tailed horned lizard	<i>Phrynosoma mcalli</i>	SSCS	Sand	Sp, S, F	None
Chuckwalla	<i>Sauromalus obesus</i>	R/S	Scrub	Y	None
Colorado Desert fringe-toed lizard	<i>Uma notata notata</i>	SSCS	Sand	Y	None
Rosy boa	<i>Charina trivirgata</i>	R/S	Scrub, Riparian	Y	None
Desert tortoise	<i>Gopherus agassizi</i>	ST, FT	Scrub	Y	None
Desert pupfish	<i>Cyprinodon macularius</i>	SE, FE	Open Water	Y	None
Flannelmouth sucker	<i>Catostomus latipinnis</i>	R/S	Open Water	Y	None
Razorback sucker	<i>Xyrauchen texanus</i>	SE, FE	Open Water	Y	None

Common Name	Scientific Name	Status	Habitat	Local Presence	Potential for Being Impacted
Bonytail	<i>Gila elegans</i>	SE, FE	Open Water	Y	None
California brown pelican	<i>Pelecanus occidentalis californicus</i>	SE, FE	Open Water, Mudflat	Y	None
American white pelican	<i>Pelecanus erythrorhynchos</i>	SSCS	Open Water, Mudflat	Y	None
Double-crested cormorant	<i>Phalacrocorax auritus</i>	SSCS	Open Water	Y	None
American bittern	<i>Botaurus lentiginosus</i>	R/S	Wetland	Y	None
Western least bittern	<i>Ixobrychus exilis hesperis</i>	SSCS	Wetland	Y	None
Great blue heron	<i>Ardea herodias</i>	R/S	Mudflat, Wetland	Y	None
Great egret	<i>Ardea alba</i>	R/S	Mudflat, Wetland	Y	None
Snowy egret	<i>Egretta thula</i>	R/S	Mudflat, Wetland	Y	None
Black-crowned night heron	<i>Nycticorax nycticorax</i>	R/S	Wetland	Y	None
White-faced ibis	<i>Plegadis chihi</i>	SSCS	Wetland, Ag	Y	Low
Wood stork	<i>Mycteria americana</i>	SSCS	Mudflat, Wetland	S, F	None
Aleutian Canada goose	<i>Branta canadensis leucopareia</i>	R/S	Ag, Wetland	F, W	Low
Canvasback	<i>Aythya valisineria</i>	R/S	Open Water	Y	None
Osprey	<i>Pandion haliaetus</i>	SSCS	Riparian, Open Water	Y	None
Bald eagle	<i>Haliaeetus leucocephalus</i>	SE, FT	Mudflat, Open Water	W	None
Northern harrier	<i>Circus cyaneus</i>	SSCS	Ag, Wetland	Y	Low
Sharp-shinned hawk	<i>Accipiter striatus</i>	SSCS	Riparian, Scrub	Sp, F, W	None
Cooper's hawk	<i>Accipter cooperi</i>	SSCS	Riparian, Scrub	Sp, F, W	None
Harris' hawk	<i>Parabuteo unicinctus</i>	SSCS	Scrub	Y	None
Swainson's hawk	<i>Buteo swainsoni</i>	ST	Ag	S, W	Low

Common Name	Scientific Name	Status	Habitat	Local Presence	Potential for Being Impacted
Merlin	<i>Falco columbarius</i>	SSCS	Ag	F, W	Low
Prairie falcon	<i>Falco mexicanus</i>	SSCS	Ag	Y	Low
American peregrine falcon	<i>Falco peregrinus anatum</i>	SE	Wetland, Cave/Cliff	W	None
California black rail	<i>Laterallus jamaicensis coturniculus</i>	ST	Wetland	Y	None
Yuma clapper rail	<i>Rallus longirostris yumanesis</i>	ST, FE	Wetland	Y	None
Greater sandhill crane	<i>Grus canadensis tabida</i>	ST	Ag	F, W	Low
Western snowy plover	<i>Charadrius alexandrinus nivosus</i>	FT	Mudflat	Y	None
Mountain plover	<i>Charadrius montanus</i>	SSCS	Ag	Sp, F, W	Low
Long-billed curlew	<i>Numenius americanus</i>	SSCS	Wetland, Ag	Y	Low
California gull	<i>Larus californicus</i>	SSCS	Open Water, Mudflat, Ag	Y	Low
Caspian tern	<i>Sterna caspia</i>	R/S	Open Water, Mudflat	Y	None
Forster's tern	<i>Sterna forsteri</i>	R/S	Open Water, Mudflat	Y	None
Black tern	<i>Chlidonias niger</i>	SSCS	Mudflat, Ag	Sp, S, F	Low
Western yellow-billed cuckoo	<i>Coccyzus americanus occidentalis</i>	SE	Riparian	S	None
Elf owl	<i>Micrathene whitneyi</i>	SE	Scrub	Sp, S, F	None
Burrowing owl	<i>Athene cunicularia</i>	SSCS	Ag	Y	Low
Long-eared owl	<i>Asio otus</i>	SSCS	Riparian	W	None
Vaux's swift	<i>Chaetura vauxi</i>	SSCS	Aerial, Riparian	Sp, F	None
Rufous hummingbird	<i>Selasphorus rufus</i>	R/S	Riparian	F	None
Gila woodpecker	<i>Melanerpes uropygialis</i>	SE	Houses, Scrub, Riparian	Y	Low
Olive-sided flycatcher	<i>Contopus borealis</i>	R/S	Houses, Scrub	Sp, F	Low
Willow flycatcher	<i>Empidonix traillii</i>	SE	Riparian, Scrub	Sp, S, F	None

Common Name	Scientific Name	Status	Habitat	Local Presence	Potential for Being Impacted
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	FE	Riparian, Scrub	Sp, S, F	None
Vermilion flycatcher	<i>Pyrocephalus rubinus</i>	SSCS	Riparian	Y	None
Brown-crested flycatcher	<i>Myiarchus tyrannulus</i>	SSCS	Riparian, Scrub	Sp, S	None
California horned lark	<i>Eremophila alpestris actia</i>	SSCS	Ag	Y	Low
Bank swallow	<i>Riparia riparia</i>	ST	Aerial, Ag	Sp, S, F	Low
Coastal cactus wren	<i>Campylorhynchus brunneicapillus couesi</i>	SSCS	Scrub	Y	None
Black-tailed gnatcatcher	<i>Polioptila melanura</i>	R/S	Scrub	Y	None
Crissal thrasher	<i>Toxostoma crissale</i>	SSCS	Scrub, Riparian	Y	None
Le Conte's thrasher	<i>Toxostoma lecontei</i>	SSCS	Scrub	Y	None
Loggerhead shrike	<i>Lanius ludovicianus</i>	SSCS	Scrub, Ag	Y	Low
Arizona Bell's vireo	<i>Vireo bellii arizonae</i>	SE	Scrub, Riparian	Sp, S, F	None
Least Bell's vireo	<i>Vireo bellii pusillus</i>	SE, FE	Riparian	Sp, S	None
Hermit warbler	<i>Dendroica occidentalis</i>	R/S	Scrub, Houses	Sp, F	Low
Yellow warbler	<i>Dendroica petechia brewsteri</i>	SSCS	Riparian, Houses	Sp, F, W	Low
Sonoran yellow warbler	<i>Dendroica petechia sonorana</i>	SSCS	Riparian, Houses	Sp, S, F	Low
Lucy's warbler	<i>Vermivora luciae</i>	R/S	Riparian	Sp, S	None
Saltmarsh common yellowthroat	<i>Geothlypis trichas sinuosa</i>	SSCS	Riparian, Wetland	Y	None
Yellow-breasted chat	<i>Icteria virens</i>	SSCS	Riparian	Sp, S, F	None
Summer tanager	<i>Piranga rubra</i>	SSCS	Houses	F	Low
Abert's towhee	<i>Pipilo aberti</i>	R/S	Scrub	Y	None
Chipping sparrow	<i>Spizella passerina</i>	R/S	Houses	Sp, F, W	Low
Brewer's sparrow	<i>Spizella breweri</i>	R/S	Ag, Scrub	Sp, F, W	Low
Bell's sage sparrow	<i>Amphispiza belli belli</i>	SSCS	Scrub	F, W	None
Large-billed savannah sparrow	<i>Passerculus sandwichensis rostratus</i>	SSCS	Ag, Mudflat, Scrub, Wetland	W	Low
California gray-headed junco	<i>Junco hyemalis caniceps</i>	SSCS	Scrub, Ag	Sp, F, W	Low
Yellow-headed blackbird	<i>Xanthocephalus xanthocephalus</i>	R/S	Wetland, Ag	Y	Low

Common Name	Scientific Name	Status	Habitat	Local Presence	Potential for Being Impacted
Pale big-eared bat	<i>Corynorhinus townsendii pallescens</i>	SSCS	Aerial, Cave/Cliff, Houses	Y	Low
California leaf-nosed bat	<i>Macrotus californicus</i>	SSCS	Aerial, Cave/Cliff, Scrub, Ag	Y	Low
Mexican long-tongued bat	<i>Choeronycteris mexicana</i>	SSCS	Aerial, Cave/Cliff, Scrub	Sp, S, F	None
Spotted bat	<i>Euderma maculatum</i>	SSCS	Aerial, Cave/Cliff, Scrub, Ag	Y	Low
Pallid bat	<i>Antrozous pallidus</i>	SSCS	Aerial, Cave/Cliff, Scrub, Ag	Y	Low
Pocketed free-tailed bat	<i>Nyctinomops femorasaccus</i>	SSCS	Aerial, Scrub, Riparian	Y	None
Big free-tailed bat	<i>Nyctinomops macrotis</i>	SSCS	Aerial, Cave/Cliff, Open Water	Y	None
Townsend's western big-eared bat	<i>Plecotus townsendii townsendii</i>	SSCS	Aerial, Cave/Cliff, Scrub, Ag	Y	Low
Small-footed myotis	<i>Myotis ciliolabrum</i>	R/S	Aerial, Cave/Cliff, Scrub	Y	None
Fringed myotis	<i>Myotis thysanodes</i>	R/S	Aerial, Cave/Cliff, Scrub, Houses	Y	Low
Cave myotis	<i>Myotis velifer</i>	SSCS	Aerial, Cave/Cliff, Scrub, Houses	Y	Low
Long-legged myotis	<i>Myotis volans</i>	R/S	Aerial, Cave/Cliff, Scrub, Houses	Y	Low
Yuma myotis	<i>Myotis yumanensis</i>	R/S	Aerial, Cave/Cliff, Scrub, Houses	Y	Low

Common Name	Scientific Name	Status	Habitat	Local Presence	Potential for Being Impacted
California western mastiff bat	<i>Eumops perotis californicus</i>	SSCS	Aerial, Cave, Scrub, Ag	Y	Low
Palm Springs round-tailed ground squirrel	<i>Spermophilus tereticaudus chlorus</i>	SSCS	Scrub	Y	None
Colorado River cotton rat	<i>Sigmodon arizonae plenus</i>	SSCS	Ag, Riparian	Y	Low
Yuma hispid cotton rat	<i>Sigmodon hispidus eremicus</i>	SSCS	Ag, Riparian	Y	Low
Colorado Valley woodrat	<i>Neotoma albigula venusta</i>	R/S	Scrub	Y	None
American badger	<i>Taxidea taxus</i>	R/S	Scrub	Y	None
Nelson's bighorn sheep	<i>Ovis canadensis nelsoni</i>	R/S	Scrub	Y	None
Plants = 2					
Foxtail cactus	<i>Coryphantha alversonii</i>	R/S	Scrub	Y	None
Wiggins' cholla	<i>Opuntia wigginsii</i>	R/S	Scrub	Y	None
Critical Habitat = 1					
Razorback sucker	not applicable	not applicable	Open water, Riparian	not applicable	None
Natural Communities = 2					
Sonoran cottonwood willow riparian forest	not applicable	not applicable	not applicable	not applicable	None
Freshwater marsh	not applicable	not applicable	not applicable	not applicable	None

Legend:

Status: FE = Federal Endangered
FT = Federal Threatened
SE = State Endangered
SE-FP = State Endangered - Fully Protected
ST = State Threatened
ST-FP = State Threatened - Fully Protected
SSCS = State Special Concern Species
SSCS-FP = State Special Concern Species - Fully Protected
R/S = Rare or Sensitive

Habitat: Aerial = strong flying species most often seen in the air
Ag = agricultural land

Cave/Cliff = cave, mine, cliff crevices
Houses = houses and residential areas (buildings and planted trees/bushes provide wildlife cover and food)
Mudflat = mudflat / beach
Open Water = open water areas (e.g., Salton Sea and drain channels)
Riparian = shrubby vegetation (e.g., willow, tamarisk) along water bodies
Sand = fine sand
Scrub = non-riparian brushy areas (e.g., various desert scrub communities)
Wetland = freshwater marsh

Local

Presence: Sp = Spring (about April through May)
S = Summer (about June through August)
F = Fall (about September through October)
W = Winter (about November through March)
Y = Year-round (resident, or visitors throughout the year)

Special Status Wildlife

Over one-hundred special status wildlife species, including twenty threatened and/or endangered species, were identified in the literature review as occurring or potentially occurring in the project vicinity (Table 5). However, some of these species do not occur on-site due to a lack of suitable habitat (e.g., fine sand), and thus will not be impacted by the project.

The project impact of most concern regarding wildlife is the indirect impact of noise and dust related to MP implementation on agricultural land and residential areas. This impact is temporary, and will no longer be an issue once MP implementation is accomplished. Decreased pathogen levels themselves will not impact wildlife populations, as current levels are not adversely affecting them. Therefore, species that used agricultural land or residential areas have a low potential for being impacted by the project.

The following bullet statements summarize project impacts on the threatened and endangered wildlife species potentially occurring in the project vicinity (Table 5). Impacts to wildlife that are not threatened or endangered (i.e., state special concern species, rare/sensitive) are summarized in Table 5.

- Four threatened and/or endangered species use agricultural and residential areas, and may be affected by temporary noise impacts associated with MP implementation. These species include the Swainson's hawk, Greater sandhill crane, Gila woodpecker, and Bank swallow. However, these species have a low potential for being impacted by the project, because noise impacts will be temporary and conducted in accordance with mitigation measures. Impacts to these wildlife species can be reduced substantially through mitigation measures, which are likely to include seasonal restrictions, so that noise will be limited to periods outside of the nesting season. Reduced pathogen levels themselves will not affect these species, as there is no evidence that wildlife is adversely affected by current levels.

- Sixteen threatened and/or endangered species use habitats (e.g., desert scrub, fine sand, riparian, open water, cave/cliff, mudflat, and wetland) not affected by temporary noise impacts associated with MP implementation on agricultural and residential land. These species include the Desert tortoise, Desert pupfish, Razorback sucker, Bonytail, California brown pelican, Bald eagle, American peregrine falcon, Western snowy plover, California black rail, Yuma clapper rail, Western yellow-billed cuckoo, Elf owl, Willow flycatcher, Southwestern willow flycatcher, Arizona Bell's vireo, and Least Bell's Vireo. Reduced pathogen levels themselves will not affect these species, as there is no evidence that wildlife is adversely affected by current levels. Therefore, these species will not be impacted by the project.

Special Status Plants

Two special status plant species, including zero threatened and/or endangered species, were identified in the literature review as occurring or potentially occurring in the project vicinity (Table 5). The following bullet statements summarize project impacts on these species.

- The Foxtail cactus and Wiggins' cholla are not threatened or endangered, but are considered rare or otherwise sensitive. Both species occupy desert scrub habitat, which will not be affected by temporary noise impacts associated with MP implementation on agricultural and residential land. Reduced pathogen levels themselves will not affect these species, as excess pathogen levels are found in water habitats and not in desert scrub habitat. Therefore, these species will not be impacted by the project.

Critical Habitat

One designated critical habitat was identified in the literature review as occurring in the project area (Table 5). Critical habitat for the endangered Razorback sucker was designated in 1994, and is located at Lake Mead and Lake Mojave, and the river reach between them; and on the Colorado River from Parker Dam to Imperial Dam, including Imperial Reservoir. Critical habitat encompasses open water and floodplain areas, and includes critical habitat components of water (quantity and quality), physical habitat (spawning, nursery, corridors), and biological environment (food supply, predation, competition). Critical habitat components will not be affected by temporary noise impacts associated with MP implementation on agricultural and residential land. Reduced pathogen levels themselves will not negatively affect critical habitat components. Therefore, critical habitat for the Razorback sucker will not be impacted by the project.

Special Status Natural Communities

Two special status natural communities were identified in the literature review as occurring or potentially occurring in the project vicinity (Table 5). The following bullet statements summarize project impacts on the special status natural communities potentially occurring in the project vicinity.

- Sonoran Cottonwood Willow Riparian Forest may occur in isolated patches in the

project area. This habitat type will not be affected by temporary noise impacts associated with MP implementation on agricultural and residential land. Reduced pathogen levels themselves will not affect this habitat type, as excess pathogen levels are found in water habitats and not in forest habitat. Therefore, this natural community will not be impacted by the project.

- Freshwater marsh occurs all the way across in narrow tributary drains, and along the edges of the Outfall Drain. This habitat type will not be affected by temporary noise impacts associated with MP implementation on agricultural and residential land. Reduced pathogen levels themselves will not affect this habitat type, as the reduction of excess pathogen levels will not affect the ability of this habitat to thrive. Therefore, this natural community will not be impacted by the project.

PROJECT ALTERNATIVES

The proposed Bacterial Indicators TMDL for Palo Verde Outfall Drain (i.e., Preferred Alternative) has been the basis for all discussions in environmental documents, including this Natural Environment Study. However, other alternatives exist, including a No Action Alternative, a Shorter Compliance Timeframe Alternative, and an Increased Regulatory Oversight Alternative. Each alternative is described below, with an assessment of impacts upon biological resources.

No Action Alternative

The No Action Alternative is defined as no Regional Board adoption of a TMDL and corresponding Implementation Plan. This means that pathogen levels will continue to: (a) violate Basin Plan water quality objectives, (b) impair beneficial uses, and (c) place the health of human communities at unacceptable risk. This alternative does not comply with the Clean Water Act or meet the purpose of the proposed action, which is to alleviate water quality problems. It is precisely because of these problems that law dictates a regulatory action. However, current pathogen levels are not a health risk to wildlife populations, based on: (a) wildlife being the major source of pathogens, and (b) a lack of wildlife disease outbreaks. Accordingly, this alternative would result in no impact upon biological resources. However, the No Action alternative is not acceptable because of human health risks.

Preferred Alternative

The Preferred Alternative is defined as a Basin Plan amendment that will require responsible parties to utilize pathogen-control Management Practices (MPs) so that the project area will come into compliance with existing Basin Plan water quality objectives. This alternative requires full compliance within ten years. The Preferred Alternative is a feasible approach to decrease existing pathogen levels, and thus to decrease health risks for human communities. The timeframe is moderately aggressive yet reasonable, allowing sufficient time for responsible parties to evaluate MPS, and potentially apply for and be awarded grant money for MP implementation. This alternative would result in no impact upon biological resources, for the same reasons as stated in the No Action Alternative.

Shorter Compliance Timeframe Alternative (Alternative 2)

The Shorter Compliance Timeframe Alternative (Alternative 2) is defined as the proposed project requiring compliance within five years, instead of ten years in the Preferred Alternative. This alternative would result in no impact upon biological resources (as in the Preferred Alternative), but the economic impacts would be much greater as it could force MP implementation to proceed without responsible parties having sufficient time to apply for and be awarded grant money.

Increased Regulatory Oversight Alternative (Alternative 3)

The Increased Regulatory Oversight Alternative (Alternative 3) is defined as the proposed project with an Implementation Plan of greater regulatory oversight. Such oversight could include requiring Riverside and Imperial Counties to: (a) collect data on septic system maintenance and failure rates, and (b) report such data to the Regional Board. This alternative would result in no impact upon biological resources (as in the Preferred Alternative), but could be unnecessarily burdensome on the regulated community, and exhaustive of limited Regional

Board staff resources.

REFERENCES

References Cited

- Bennett, J. 1998. Biological Effects of Selenium and Other Contaminants Associated with Irrigation Drainage in the Salton Sea Area, California 1992-1994. U.S. Department of Interior National Irrigation Water Quality Program Information Report No. 4. U.S. Department of the Interior, National Irrigation Water Quality Program, Washington, D.C.
- California Department of Fish and Game. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California. State of California Resources Agency. Sacramento, CA
- California Department of Fish and Game. 2002. Letter from California Department of Fish and Game to the Regional Water Quality Control Board regarding Water Quality Monitoring Activities. May. California Regional Water Quality Control Board, Palm Desert, CA
- California Department of Fish and Game, Natural Diversity Database. July 2003. Special Animals. 46 pp. Sacramento, CA
- California Department of Fish and Game, Natural Diversity Database. September 2003. List of California Terrestrial Natural Communities Recognized by The California Natural Diversity Database. 77 pp. Sacramento, CA
- California Department of Fish and Game, Natural Diversity Database. October 2003. Special Vascular Plants, Bryophytes, and Lichens List. Biannual publication, Mimeo. 97 pp. Sacramento, CA
- California Department of Fish and Game. 2003. Natural Diversity Database. Query for Palo Verde, Blythe, and Cibola quadrangles. CD-ROM. Sacramento, CA
- California Regional Water Quality Control Board. 2003. Water Quality Control Plan for the Colorado River Basin, as amended to date. California Regional Water Quality Control Board, Colorado River Basin Region, Palm Desert, CA
- Palo Verde Irrigation District. 2002. Land Management, Crop Rotations and Water Supply Program, Draft Environmental Impact Report. Available on CD ROM. Blythe, CA
- Tetra Tech, Inc. January 2003. Draft Total Maximum Daily Load Development for the Rabon Creek Watershed, SC. Prepared for EPA Region 4 and South Carolina Department of Health and Environmental Control. Fairfax, VA
- Tetra Tech, Inc. March 2003. Draft Source Analysis, Load Assessment, and Loading Allocations for Palo Verde Outfall Drain Bacteria TMDL. Prepared for California Regional Water Quality Control Board, Region 7 Colorado River Basin. Fairfax, VA
- U.S. Bureau of Reclamation. 1996. Description and Assessment of Operations, Maintenance, and Sensitive Species of the Lower Colorado River. Prepared for the U.S. Fish and Wildlife

Service and Lower Colorado River Multi-Species Conservation Program. August. U.S. Bureau of Reclamation, Lower Colorado Region. Boulder City, NV

United States Fish and Wildlife Service, Salton Sea National Wildlife Refuge. 1997. Salton Sea National Wildlife Refuge: Watchable Wildlife. Salton Sea National Wildlife Refuge. Calipatria, CA

U.S. Fish and Wildlife Service. 2003. Cibola National Wildlife Refuge. Available online at <http://southwest.fws.gov/refuges/arizona/cibola.html#Wildlife>

U.S. Geological Survey. 2002. Query of Multi-Resolution Land Characterization (MRLC) land use database. Conducted by Tetra Tech. 2002.

References Relied Upon

Burt, W.H. and R.P. Grossenheider. 1976. A Field Guide to the Mammals. Houghton Mifflin. Boston, MA

California Department of Fish and Game. 2000. The Status of Rare, Threatened, and Endangered Animals and Plants of California 2000. State of California Resources Agency. Sacramento, CA

California Department of Fish and Game. 2001. California Wildlife Habitat Relationships System website. Database search conducted from October 2001 to February 2002. Fact sheets available online at <http://www.dfg.ca.gov/whdab>

California Regional Water Quality Control Board. 1994. Water Quality Control Plan, Colorado River Basin—Region 7. State Water Resources Control Board, Colorado River Basin Region. Palm Desert, CA

Imperial Valley College. 2003. Desert Life in the Imperial Valley. Available online at <http://www.imperial.cc.ca.us/ivc-dm/ivdesert.htm>

MacMahon, James A. 1997. National Audubon Society Nature Guides : Deserts. Alfred A. Knopf. New York, NY

Mooney, Brian F. Associates. 1993. Draft Environmental Impact Report for the County of Imperial General Plan (SCH #93011023). Prepared for the County of Imperial Planning Department. January 1993. El Centro, CA

National Geographic Society. 1987. Field Guide to the Birds of North America. 2nd ed. The National Geographic Society. Washington, D.C.

Stebbins, Robert C. 1985. Peterson Field Guides: Western Reptiles and Amphibians. Houghton Mifflin Company. Boston, MA

U.S. Bureau of Reclamation. 1996. Description and Assessment of Operations, Maintenance, and Sensitive Species of the Lower Colorado River. Prepared for the U.S. Fish and Wildlife Service and Lower Colorado River Multi-Species Conservation Program. August. U.S. Bureau of Reclamation, Lower Colorado Region. Boulder City, NV

U.S. Fish and Wildlife Service. 1995. Birds of Cibola National Wildlife Refuge. U.S. Fish and Wildlife Service. Unpaginated. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page. <http://www.npwrc.usgs.gov/resource/othrdata/chekbird/r2/cibola.htm> (Version 22MAY98).